Does inflation targeting reduce sovereign risk?

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Further evidence

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Abstract

We examine whether adopting an inflation-targeting regime helps reduce sovereign risk premia in a sample of 102 advanced and developing countries for the period 1985-2012. We address the self-selection problem of policy adoption by applying a variety of propensity score matching methods. The results provide evidence that inflation targeting lowers sovereign risk.

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1. Introduction

In this paper, we examine whether adoption of an inflation targeting (IT) monetary framework has a beneficial effect on sovereign risk premia. There are at least four reasons for believing that this might be the case. First, if IT lowers inflation and inflation uncertainty relative to other monetary policy frameworks, as its proponents claim, this should have a beneficial impact on the country risk.[1] In fact, several studies (Vega and Winkelried 2005; Mishkin and Schmidt-Hebbel 2007; Gonçalves and Salles 2008; Lin and Ye 2009) find that IT does lead to better outcomes in terms of inflation performance, especially in emerging market economies. Second, the rules-based approach of IT and its emphasis on transparency and accountability may enhance policy credibility relative to other frameworks and is likely to be more successful in reducing the risk premium on sovereign borrowing (Palomino, 2012). Third, adoption of IT may signal a commitment to economic reforms and sounder macroeconomic policies more generally, which should serve to reduce risk premia (Roger 2010). Finally, the nominal exchange rate flexibility inherent in IT should reduce the sensitivity of risk premia to external debt because the flexibility of the exchange rate provides a mechanism for the correction of external imbalances not available with an exchange rate peg (Jahjah, Wei, and Yue 2013).

Formal empirical evidence on the impact of IT on sovereign risk premia is scarce. To the best of our knowledge, Fouejie and Roger (2013) is the only existing study that addresses this issue. They apply panel regression techniques to 40 emerging and high-income countries, including 19 inflation targeters, for the period 1989-2010 and report that adoption of IT reduces sovereign risk premia, including through the observed track record in stabilizing inflation. A drawback of the Fouejieu and Roger (2013) study, however, is that it ignores the self-selection problem of policy adoption, which can lead to biased estimates. A self-selection problem arises when a country's targeting choice is nonrandom. In particular, systematic correlation between the targeting choice and other covariates will cause the selection-on-observables problem, which can lead to biased estimates. In fact, we find strong evidence for the existence of this problem with an IT dummy in probit estimates being systematically correlated with variables such as macroeconomic performance, the level of public debt, the level of financial development, and the exchange rate regime. To address the self-selection problem, we evaluate the treatment effect of IT on sovereign risk premia making use of a variety of propensity score-matching methods developed in the treatment effect literature. Our results suggest that adoption of IT reduces sovereign risk premia by between 1.5-2.5 per cent of the international borrowing spread in IT adopting countries relative to countries with other monetary regimes.

2. Methodology

We test the impact of IT adoption on sovereign risk premia by examining developments in the spread between the interest rate at which a country borrows (the government bond yield) and the "risk free" rate, which we define as the yield on long-term U.S. Treasury bonds. In this market, the interest rate paid by governments is typically higher than the yield on US bonds. If the adoption of IT adds to a country's policy credibility then, ceteris paribus, we would expect the yield that it would need to offer on bonds to decline relative to the US yield (i.e., the "premium" on borrowing costs would decline).

The treatment group in our study comprises 23 advanced and developing countries that had adopted an IT framework by the end of 2012. We draw on Hammond (2012) for a listing of countries that adopted IT and for the adoption dates. The control group comprises 41 non-IT adopting countries for which we could access data on the relevant bond yields. The treatment and control groups are listed in Table 1. Data on long-term sovereign bond yields are from the IMF's International Financial Statistics database and from Bloomberg and refer in most cases to government bonds of 10-year maturity. Figure 1 illustrates average risk premia (spreads over the US bond yield) for countries that did and did not adopt an IT framework during 1985-2012. Premia for the two groups of countries moved sufficiently closely together to make a naïve comparison of the experiences IT-adopters and non-adopters uninformative as to the impact of IT adoption on sovereign risk, though average spreads for IT-targeters were lower throughout the period.

To address the self-selection problem, we make use of four propensity score matching methods that have been developed in the treatment effect literature and have been applied recently to evaluations of macroeconomic policy (Persson 2001, Glick, Guo, and Hutchinson 2006, Lin and Ye 2007, 2009). The first method is nearest-neighbour matching with replacement, which matches each treated country to the n control countries that have the closest propensity scores. We use two nearest-neighbour matching estimators: n = 1 and n = 3. The second method is radius matching, which performs the matching based on estimated propensity scores falling with a certain radius R. We use a wide radius (r=0.05), a medium radius (r=0.03), and a tight radius (r=0.01). The third method is the kernel matching method, which matches a treated group country to all control group countries weighted in proportion to the closeness between the treated group country and the control group country. The final method is the regression adjusted local linear matching method developed by Heckman, Ichimura, and Todd (1998).

3. Estimating the average treatment effects

We first use the following probit model to estimate the propensity scores, which are the probabilities of adopting an IT framework conditional on a group of control variables:

$$P(Y_{it} = 1|X_{it}) = \Phi(X_{it}'\beta) + \eta_{it} \qquad (1)$$

where Y_{it} is a dummy variable for the adoption of an IT regime, X_{it} is a set of control variables, Φ is the cumulative function of the standard normal distribution, and η_{it} is the error term. We then utilize the estimated propensity scores to conduct matching to obtain the treatment effects of IT adoption (compared to those of non-IT adoption). For the control variables, we draw on Samarina and de Haan's (2014) analysis of the determinants of a country's decision to adopt an IT regime. Accordingly, the dependent variables in our baseline probit model are: the lagged inflation rate, real GDP growth, the ratios to GDP of public debt, foreign trade, and bank credit to the private sector (a measure of financial development). In addition, we employ the Chinn and Ito (2006) financial openness index, and a measure of exchange rate regime flexibility, for which we use the Reinhart and Rogoff (2004) and Ilzetzki, Reinhart, and Rogoff (2008) classification system.[2] The macroeconomic variables are from the World Bank's World Development Indicators database, and we draw on Abbas et al.

(2010) and the IMF's World Economic Outlook database for data on public debt. The probit results are report in Table 2. The baseline result (column 1) broadly supports the Samarina and de Haan (2014) analysis—that is, IT adoption is more likely in countries that have relatively low rates of GDP growth, relatively low rates of inflation and levels of public debt, are more integrated into the global economy, and have more flexible exchange rate regimes and relatively well developed financial systems.

To ensure that the treatment group and the control group are reasonably comparable, we first sort the observations by their estimated propensity scores and discard the control group countries whose estimated propensity scores are lower than the lowest score among the treated group countries (Perrson 2001). The matching results based on the new sample are presented in Table 3, which reports the estimated average treatment effect on the treated (ATTs). The first two columns of the table show the results from one-to-one nearest neighbour matching and three-nearest-neighbour matching, respectively. The results from radius matching are reported in following three columns, and the results from local linear regression matching and from kernel matching are reported in the final two columns. The baseline results are in the first row of the table, which reports ATTs that are negative, highly statistically significant, and relatively large in magnitude. The average risk premia falls by between 1.6-2.6 per cent of the annual yield spread—that is, adoption of an IT framework appears to have quantitatively large and statistically significant effects on lowering sovereign risk premia.

We carry out three tests to check the robustness of our finding that IT significantly reduces risk premia. First, we take into account that many countries in the sample (inflation-targeters and non-targeters) experienced financial crises during the period, which likely impacted on the conduct of monetary policy and could bias our results. The probit estimate including a financial crisis dummy is reported in the second column of Table 2.[3] The coefficient on the crisis dummy is not statistically significant, and the associated ATTs reported in the second row of Table 3 remain of the same sign, are statistically significant and are of a similar magnitude as the baseline results. Second, we examine the sensitivity of our results to a change in the sample period by focusing on the post-1990 period. The probit result for this period is reported in the third column of Table 2 and shows little difference in the coefficients and overall fit of the estimate compared to the baseline result. Similarly, the associated ATTs that are reported in the third row of Table 3 remain statistically significant—if anything, the impact on risk premia of adopting IT is somewhat larger. Finally, we examine the sensitivity of the results to the country composition of the sample. To this end, we drop from the sample all low-income countries on the basis that they might be expected to face greater difficulty in managing the technical challenges of implementing an IT regime.[4] The probit results for this reduced sample are reported in the final column of Table 2. The results are broadly in line with the baseline estimate, though the overall fit of the equation is not as good. The ATTs on risk premia for the reduced sample are reported in the final row of Table 3. They remain of the expected sign and statistically significant, though the ATTs are about 40 per cent lower than in the baseline case.

4. Conclusions

In this paper, we evaluated the treatment effect of adopting an IT framework on sovereign risk premia. Using different propensity score matching methods, we showed that the adoption of IT resulted in a statistically significant and quite large reduction in sovereign risk premia—on average, by 1.6-2.6 per cent of the annual yield spread. We view our results as consistent with the adoption of an IT regime helping build policy credibility and thereby reducing the sovereign risk premia that compensate lenders for the possibility of default.

Footnotes

1. See Bernanke et al. (1999) and Mishkin (1999) for claims that inflation targeting should reduce inflation and inflation variability and add to policy credibility.

2. We employ the Reinhart and Rogoff coarse grid categorization of exchange rate regimes, which ranges from 1 (least flexible) to 5 (most flexible).

3. The annual financial crisis dummies are from Reinhart and Rogoff (2011).

4. We define low-income economies according to the country classification system of the World Bank, which classifies countries by gross national income (GNI) per capita to help determine the eligibility of member countries to receive loans.

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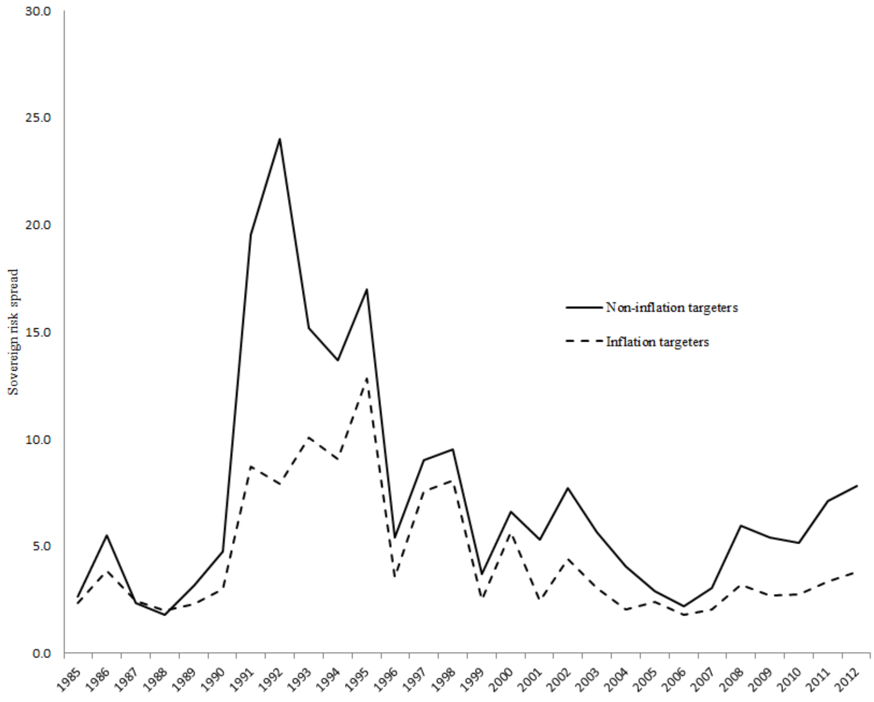

FIG. 1 Average sovereign risk premia in inflation targeting and non-targeting countries

Table 1
Treatment and control groups for sovereign risk premia, 1985-2012

Treatment group (inflation targeters
Armenia, Australia, Canada, Chile, Colombia, Czech Republic, Ghana, Hungary, Indonesia, Iceland, Israel, Korea, Mexico, New Zealand, Norway, Philippines, Poland, Romania, South Africa, Sweden, Thailand, Turkey, United Kingdom
Control group (non-inflation targeters)
Argentina, Austria, Belgium, Botswana, Bulgaria, Burundi, China, Denmark, Ethiopia, Fiji, Finland, France, Germany, Greece, India, Ireland, Italy, Japan, Jordan, Kazakhstan, Sri Lanka, Latvia, Lithuania, Malaysia, Malta, Moldova, Namibia, Netherlands, Nigeria, Nepal, Pakistan, Papua New Guinea, Portugal, Russia, Singapore, Seychelles, Sierra Leone, Slovak Republic, Slovenia, Spain, Switzerland

Table 2
Probit estimates of propensity scores for inflation targeting

	Baseline	Add financial crisis	Post-1990 sample	Drop low income counties
Lagged inflation	-0.0714***	-0.0739***	-0.0672***	-0.0741***
	(0.0095)	(0.010)	(0.0089)	(0.0099)
GDP growth	-0.0274***	-0.0298***	-0.0212***	-0.0211*
	(0.0122)	(0.0142)	(0.0123)	(0.0128)
Public debt	-0.0107***	-0.0129***	-0.0104***	-0.0087***
	(0.0016)	(0.0018)	(0.0016)	(0.0015)
Trade openness	-0.0022**	-0.0017**	-0.0026**	-0.0024**
	(0.0016)	(0.0008)	(0.0008)	(0.0007)
Financial openness	0.0357	0.0243	0.0259	0.0115
	(0.0345)	(0.0361)	(0.0359)	(0.0376)
Financial development	-0.0043***	-0.0054***	-0.0043***	-0.0045***
	(0.0011)	(0.0011)	(0.0011)	(0.0011)
Exchange rate regime	-1.0302***	-1.0616***	-1.0694***	-0.9862***
	(0.0933)	(0.0996)	(0.0959)	(0.0933)
Financial crisis		-0.3232		
		(0.3077)		
Pseudo R^2	0.216	0.231	0.217	0.199
Observations	1,187	1,057	1,051	907

Constant terms are included but not reported. Robust standard errors in parenthesis. ***, **, and * indicate statistical significance at the levels of 1, 5 and 10%, respectively.